

### **REMARKS**

Claims 1-5, 7-9, and 11-14 are pending in the present application, claims 14 and 15 having been added herein. The Office Action and cited references have been considered. Favorable reconsideration is respectfully requested.

Applicant notes the constructive election and withdrawal of claim 13 from examination.

New claim 14 has been added, which recites that a first of the threaded portions of the fastening pin fits inside the threaded hole on the shell, and a second of the threaded portions of the fastening pin fits inside the threaded hole on the roll core, and a second threaded portion of the fastening pin has a larger pitch than the pitch of the first threaded portion of the fastening pin. Support for this limitation can be found, e.g., on page 12, line 26 – page 13, line 2, and figures 13-15. Claim 15 has been added, which recites that the second threaded portion of the fastening pin is of a larger diameter than the first threaded portion of the fastening pin. Support for this limitation can be found, e.g., on page 13, lines 2-5, and figures 13-15.

### **Claim Objection**

The claims were objected to because of the use of the reference numbers not matching the elected species. Applicants note this objection and have amended the claims to remove all of the reference numbers. Withdrawal of this objection is respectfully requested.

**35 U.S.C. § 112, First Paragraph**

Claim 11 was rejected as not being supported by the written description of the specification. Applicant has amended claim 11 to overcome this rejection. In addition, Applicant has fixed claim 11 so as to clarify the antecedent basis for the various elements with respect to claim 1. Claim 11 now recites "receiving means comprising the hole in the roll core and a hole in the shell, the hole in the roll core has a threaded portion and the hole in the shell has a threaded portion, the threaded portions having different pitches for associating with the fastening pin." Applicant respectfully submits that this limitation is supported in the specification, at least at page 12, line 28- page 13, line 2. Accordingly, withdrawal of this rejection is respectfully requested.

**35 U.S.C. §112, Second Paragraph**

Claims 1, 4, 5, 7, 11 and 12 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim subject matter of claimed invention. Applicants note this rejection and have amended the claims to conform to the Examiner's suggestion. The 35 U.S.C. §112 issue raised by the Examiner is therefore addressed. Withdrawal of the rejection is respectfully requested.

**Claim Rejections under 35 U.S.C. §102/103**

Claims 1, 7 and 11 were rejected under 35 U.S.C. § 103(a) as being obvious over German Publication 22 25 152 ("Haas") in view of U.S. Patent No. 3,942,210 ("Clark") and/or U.S. Patent No. 2,360,826 ("Cherry") and/or U.S. Patent No. 3,405,751 ("Parr") and/or U.S. Patent No. 4,661,031 ("Heine"). Claims 4, 5, and 12

were rejected under 35 U.S.C. § 103(a) as being obvious over GP'152 in view of Clark, and/or Cherry and/or Parr and/or Heine and further in view of U.S. Patent No. 3,285,642 ("Sauer"). Applicant respectfully traverses these rejections.

Claim 1 recites a cutting arrangement which is disposed on a distance of travel of a web of corrugated board that is continuously produced by a corrugating machine, the cutting arrangement comprising a blade shaft which is mounted on a blade-shaft axis of rotation for drivable rotation and which comprises at least one circular blade thereon, and a brush roll which is disposed opposite to the blade shaft and mounted for rotation about an axis of rotation, supporting the web of corrugated board which passes between the circular blade and the brush roll when the web of corrugated board is cut by the at least one circular blade. The brush roll comprises shells which are disposed on a roll core and have a cross-sectional shape of a segment of a circle and which have an outside and an inside, the inside faces towards the roll core, bristles which stand out from the outside, torque-transmission means for transmitting torque from the roll core to the shells, and fastening means for fixing the shells to the roll core. Threaded holes are provided in the roll core and on the inside of the shells, respectively accommodating a fastening pin for non-rotary connection of the shell with the roll core, and the fastening pin comprises two threaded portions of different pitches. This is not taught, disclosed or made obvious by the prior art of record.

In support of the arguments presented herein, Applicant is submitting herewith a Declaration under 37 C.F.R. § 1.132 of Karl Ruhland ("Ruhland Decl., ¶ \_\_\_\_"),

the inventor of the present invention. Mr. Ruhland has been working in the field of manufacturing sheets of corrugated board for 14 years. Ruhland Decl., ¶ 2. He has a basic understanding of the standards for obviousness, and has reviewed the present application and prosecution record. Ruhland Decl., ¶¶ 1-9.

Mr. Ruhland explains the genesis of his invention. Specifically, webs of corrugated board are produced on corrugating machines and then cut to size. Therefore, longitudinal cuts are produced in pre-determined positions. In a longitudinal cutting arrangement driven circular blades are arranged on one side of a web of corrugated board. A brush roll is located on the opposite side which supports the corrugated board when the longitudinal cut is made and which the circular blade can simultaneously immerse into when the cut is made. During the production of longitudinal cuts, the bristles of the brush roll are subject to wear so that the entire brush roll must be replaced regularly. This is time-consuming and costly. Ruhland Decl., ¶ 11.

When Mr. Ruhland thought about solving the aforementioned problem, he surprisingly found that a cutting arrangement according to his invention enables simple and therefore timesaving replacement of the brush roll. Therefore, the necessary replacement of the brush roll is time- and cost-effective. Since the brush roll is formed by a cylindrical, rotatable roll core enveloped by shells of a cross-sectional shape of a segment of a circle, in particular half shells, the shells are easily radially mountable on the roll core of the cutting arrangement. The shells have bristles outside. On the inside, means are provided that enable the shells to be non-rotatably joined to the roll core. That means that after mounting the shells on the roll core the shells together build the

cylindrical brush roll that is fixed on the roll core. For that purpose, holes are provided in the roll core and on the inside of the shells, respectively accommodating a fastening pin for non-rotary connection of the shell with the roll core. Ruhland Decl., ¶ 12.

According to the present invention, the fastening pin that accommodates in holes in the shells as well in the roll core comprises two threaded portions of different pitches. Since the fastening pin accommodates in the holes, these also comprise different pitches, wherein a thread inside the half shell fits with a first, external thread portion of the threaded pin and an internal thread inside the roll core fits a second, internal thread portion of the threaded pin. Ruhland Decl., ¶ 12.

With this design of the fastening pin and the holes comprising threads of different pitches (claim 11), it is possible to enhance the mounting of the shells on the roll core. In a first step, the threaded pin is screwed by the first, external thread portion into the hole in the shell. After that, the half shell is placed on the roll core. Then the threaded pin is screwed from outside of the shell through the hole in the shell with the second, internal thread portion into the internal thread of the roll core. Ruhland Decl., ¶ 13.

With the pitch of the second, internal thread inside the roll core exceeding the first, external thread portion inside the shell (so that the threaded pin has two threaded portions of different pitches as recited in claim 1), the threaded pin is driven per revolution faster into the roll core than it is screwed out of the shell. In this way the shell is fastened on the roll core. By this design according to the present invention, a fast and easy mounting process is enabled. Ruhland Decl., ¶ 13.

Further, since the fastening pin comprises two threaded portions of different pitches, the shells are fastened on the roll core in a very easy and very secure way. This securing is reached by tighten the shells across the cylindrical shape of the roll core. The shells are in-plane aligned with the roll core. Ruhland Decl., ¶ 13.

Haas discloses a cutting arrangement with a cutting tool 7 and a brush roll 9 arranged opposite to the cutting tool 7. The brush roll 9 comprises two brush rings each having rows of bristles 91, 92. The brush rings are coaxially aligned and fixed to each other axially by screws (see page 7, last paragraph to page 8, first paragraph and figures 7, 8). Therefore, the brush roll according to Haas firstly has to be connected to a socket 6 and after that the socket 6 is mounted on the drive shaft 2 by a clamping mechanism. The cutting arrangement according to Haas comprises an enlarged number of single pieces and is therefore complex and cost-intensive. Further, mounting such a system is time-consuming. Ruhland Decl., ¶14.

Clark discloses a brush frame 12 and shells 14 to be mounted on the frame 12. Therefore, openings 39 and 41 are provided in the shell 14 and the frame 12, respectively. According to Clark, a conventional screw 42 is used for connecting the shells 14 with the frame 12, wherein each screw 42 extends through each opening 39 in the shell 14 and threadably engages the bore 41 in the frame. Therefore, it becomes clear that the opening 39 has no threaded portion. The connection between the shells 14 and the frame 12 is only given by the screw 42 that is held in the bore 41. This is a conventional connection of two parts by clamping with a screw, i.e., a pointwise clamping. In addition, this method does not enable a secured connection according to

the present claimed invention (see column 4, line 66 to column 5, line 7 and figures 1, 2). Ruhland Decl., ¶ 15.

Parr discloses bolts and nuts with different threaded portions. According to Parr these bolts and nuts are used as self-locking elements. This self-locking function is caused by using, for instance, a bolt according to Parr with a conventional nut, i.e., a nut with a conventional formed thread of constant pitch. Screwing in the bolt in the standard nut the threaded portion of the bolt that differs from standard gauge thread is compressed or expanded, so that yielding retains, respectively, and therefore the compressed or expanded position reaches a "static" position (see column 3, lines 34 to 49). Ruhland Decl., ¶16.

Further, Parr also describes the usage of a nut 60 of different threaded portions in cooperation with a lead screw in order to eliminate backlash between the nut and the screw. Therefore, the threaded portions 64, 66 are compressed or expanded elastically. Ruhland Decl., ¶ 16.

Contrary to the present invention, Parr discloses that one of the connecting members, i.e., screw or nut, comprises two threaded portions of different pitch and the other connecting member has a standard gauge thread. Self-locking of the connecting members is reached by elastically deformation of one of the members. Using self-locking elements according to Parr leads to pointwise elastic deformation of connecting elements (see column 3, lines 50 to 59 and figures 7, 8). This is not a secured connection. Anyway, a cutting arrangement and a brush roll comprising shells are not disclosed by Parr at all. Ruhland Decl., ¶16.

Cherry also discloses self-locking screws and bolts. According to Cherry a screw may comprise two screw threads 15, 16, wherein only the threaded portion 16 accommodates with the thread of connecting members 20, 21. The difference in the pitch or size of the threads 15, 16 is so selected that the screw can be turned into the opening by the usual operation, but with the result that the larger threads of the screw display a certain amount of metal of the female threads. This action causes a ring or waves of metal to be formed on the inner surface of the opening just ahead of the threads on the upper portion 15. This ring or wave of metal increases as the screw cuts further and further into the opening, whereby at the time that the screw is fully seated, a sufficient ring of metal has been formed on the inner surface of the opening to occupy and substantially fill the space or groove provided at the portion 17 that separates the threaded parts 15 and 16 of the screw (see page 1, right column, lines 26 to 41 and figure 1). According to Cherry, a self-locking screw cuts a thread into material. Therefore, repeated mounting and dismounting is not adequate with a screw of Cherry since the thread is irreversibly modified. Ruhland Decl., ¶17.

Heine comprises a screw with two threaded portions that are offset relative to one another. As shown in figure 2 of Heine, the threaded portion 24 has tapered threads 31 that have the same (or substantially the same) pitch as the rest of the threads 30. The crest of the tapered threads 31 gradually increases from virtually zero to attain, at the end of the taper, the crest of the regular thread 30 (see column 5, lines 51 to 56). Ruhland Decl., ¶ 18.



Firstly, a screw according to Heine does not disclose that the pitches of the threaded portions 22 and 24 are different. Secondly, using a screw having a tapered thread according to Heine unavoidably leads to a certain amount of friction and spring force which acts to lock the screw in the threaded hole 16 (see column 5, lines 66 to 68). This, similarly to Parr, leads to a pointwise and not in-plane tightening of the connecting parts. Ruhland Decl., ¶18.

Even a combination of all prior art documents cited by the Examiner does not lead to the cutting arrangement according to the present claimed invention. Even if a person ordinarily skilled in the art had tried to use self-locking elements that are disclosed by Parr, Cherry or Heine for mounting shells on a brush frame according to Clark, he would not have come to the present claimed invention. Ruhland Decl., ¶19.

Firstly, the person would not have tried to apply a screw according to Cherry since the roll core would have been cut by the screw. Therefore, if disassembly and afterwards again assembly of the cutting arrangement with a new brush roll becomes necessary, new screws - especially of larger diameter - would be necessary since the firstly used screws have irreversibly modified the hole in the roll core. One of ordinary skill in the art would have recognized this disadvantage, and would not have been motivated to make the combination in light thereof. Ruhland Decl., ¶19.

Secondly, also self-locking elements according to Parr and/or Heine do not lead to the claimed invention. Heine does not disclose a fastening pin with threaded portions of different pitches. Although Parr discloses a screw with two threaded portions of different pitch, it is further disclosed to use this self-locking element in cooperation

with a nut of constant standard gauge thread, so that the screw is elastically tightened in the nut. By usage of such fastening elements only a pointwise fixation of the brush roll on the roll core could be reached. This does not simplify assembly and disassembly and further does not enhance the security of fixation, thus, one of ordinary skill in the art would not have been motivated to use these configurations. Ruhland Decl., ¶19.

According to the present invention, the fastening pin comprises two different thread portions of different pitches, wherein each threaded portion accommodates in one thread of holes in the roll core and in the shells, respectively. Only by this design of the cutting arrangement, is it possible to easily, fast and directly connect the brush roll on the roll core. In particular, a two-dimensional, in-plane tightening of the brush roll on the roll core is enabled, and therefore the security of the mounting of the cutting arrangement according to the present invention is enhanced. Ruhland Decl., ¶ 20.

In addition, all the screws described by Parr, Cherry and Heine comprise a screw head. It is one aspect of the present invention as described in detail in paragraphs 12 and 13 of the Ruhland Declaration that the fastening pin is screwed through the hole in the brush roll on the roll core. Thus, a head on the fastening pin is not allowed, or the claimed invention would not work. Ruhland Decl., ¶ 20.

For at least these reasons, Applicant respectfully submits that the limitations of claim 1 are not found in the prior art, whether taken alone or in combination as proposed in the Office Action. Further, one of ordinary skill in the art would not have been motivated to combine the teachings of the cited references, absent

impermissible hindsight reference to Applicant's disclosure. Claims 4-5, 7, 11-12 and 14-15 are dependent from and include the limitations of claim 1 and are believed to be patentable in and of themselves and as they depend from claim 1 which is patentable for the reasons discussed above.

### **Conclusion**

In view of the above amendment and remarks, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections of record. Applicant submits that the application is in condition for allowance and early notice to this effect is most earnestly solicited.

If the Examiner has any questions, he is invited to contact the undersigned at 202-628-5197.

Respectfully submitted,

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